

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 29 January 2001 (29.01.01)	
International application No. PCT/GB00/02143	Applicant's or agent's file reference WOP12879A
International filing date (day/month/year) 02 June 2000 (02.06.00)	Priority date (day/month/year) 02 June 1999 (02.06.99)
Applicant SHIMODA, Tatsuya et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 14 December 2000 (14.12.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Olivia TEFY Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference WOP12879A	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 02143	International filing date (day/month/year) 02/06/2000	(Earliest) Priority Date (day/month/year) 02/06/1999
Applicant SEIKO EPSON CORPORATION et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/02143

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01L51/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L H05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 616 488 A (HITACHI LTD) 21 September 1994 (1994-09-21) abstract; figures	1,29
A	& PATENT ABSTRACTS OF JAPAN vol. 018, no. 681 (E-1649), 21 December 1994 (1994-12-21) & JP 06 275381 A (HITACHI LTD), 30 September 1994 (1994-09-30) cited in the application abstract	
A	EP 0 683 623 A (AT & T CORP) 22 November 1995 (1995-11-22) abstract	1,29
P,A	US 5 949 187 A (SO FRANKY ET AL) 7 September 1999 (1999-09-07) abstract	1,29

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

8 September 2000

Date of mailing of the international search report

15/09/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
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Authorized officer

De Laere, A

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/02143

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0616488 A	21-09-1994	JP 2797883 B	17-09-1998
		JP 6275381 A	30-09-1994
		DE 69410513 D	02-07-1998
		DE 69410513 T	04-03-1999
		US 5554911 A	10-09-1996
EP 0683623 A	22-11-1995	US 5478658 A	26-12-1995
		DE 69510863 D	26-08-1999
		DE 69510863 T	13-01-2000
		JP 7320864 A	08-12-1995
		US 5674636 A	07-10-1997
US 5949187 A	07-09-1999	NONE	



patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *With international search report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference WOP12879A	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/02143	International filing date (day/month/year) 02/06/2000	Priority date (day/month/year) 02/06/1999
International Patent Classification (IPC) or national classification and IPC H01L51/20		
Applicant SEIKO EPSON CORPORATION et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 14/12/2000	Date of completion of this report 27.08.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Cousins, D Telephone No. +49 89 2399 2759 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02143

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-47 as originally filed

Claims, No.:

2-29 as originally filed

1 with telefax of 30/07/2001

Drawings, sheets:

1/7-7/7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02143

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-28
	No:	Claims	29
Inventive step (IS)	Yes:	Claims	1-28
	No:	Claims	29
Industrial applicability (IA)	Yes:	Claims	1-29
	No:	Claims	

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Sections V and VIII

1. Reference is made to the following documents:

D1: EP-A-0 616 488 (HITACHI LTD) 21 September 1994 (1994-09-21) & PATENT ABSTRACTS OF JAPAN vol. 018, no. 681 (E-1649), 21 December 1994 (1994-12-21) & JP 06 275381 A (HITACHI LTD), 30 September 1994 (1994-09-30) cited in the application
D2: EP-A-0 683 623 (AT & T CORP) 22 November 1995 (1995-11-22)
D3: US-A-5 949 187 (SO FRANKY ET AL) 7 September 1999 (1999-09-07)

2. Claim 1 is unclear for the following reason:

The definition of the semi-reflecting layer group is unclear because of its vague formulation. It is clear from the description on page 18, line 6-25; Figs. 1-12 and accompanying description, that the following feature is essential to the definition of the invention:

(1) The semi-reflecting layer group consists of a first semi-reflecting layer optimised to resonate with light of a first wavelength emitted by said light emission means and at least a second semi-reflecting layer optimised to resonate with light of a second wavelength emitted by said light emission means, said second wavelength being different from the first wavelength, such that the reflecting surface for light from said light emission means side of said semi-reflecting layer is in a different position in said thickness direction in respect of different light emission wavelengths.

Since independent claim 1 does not contain this feature it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

3. The multiple wavelength light emitting device known from D1 (see Figures 1 and 2 and accompanying description) comprises the features of present claim 1, the semi-reflecting layer group (102) being stacked in order so as to correspond with

light wavelengths to be output. D1 describes only one half-mirror which constitutes only one semi-reflecting layer. Therefore the subject-matter of claim 1 is novel in view of D1 (Article 33(2) PCT).

4. The multiple wavelength light emitting device known from D2 (see page 5, lines 11-42) comprises the features of present claim 1. At least two wavelengths of emitted light may be obtained. In connection with Figure 7 it is taught that the wavelength of the light emitted from the device can be changed by changing the position of the recombination region of the device with respect to the nodes/antinodes of the modes supported by the cavity. This appears to anticipate the feature in the present claim relating to the light emission surface. However, D2 does not appear to disclose the two or more light emission regions wherein the wavelength of the output light differs. Therefore the subject-matter of claim 1 is novel in view of D2.
5. The multiple wavelength light emitting device known from D3 (see Figures 7 and 8 and accompanying description) comprises the features of present claim 1, except it does not appear to disclose the two or more light emission regions wherein the wavelength of the output light differs. Therefore the subject-matter of claim 1 is novel in view of D3.
6. Also, it would not appear to be obvious to the skilled person to provide the specific combination of features of claim 1 in order to solve the problem of providing a multiple wavelength light emitting device for emitting light of a plurality of wavelengths (Article 33(3) PCT).
7. The subject-matter of claim 29 lacks the novelty referred to in Article 33(2) PCT in view of the prior art provided by D3, the reasons being as follows:

The interference mirror known from D3 (see Fig. 1 and accompanying description) comprises all of the features of independent claim 29.

Claims:

1. A multiple wavelength light emitting device for emitting light of a plurality of differing wavelengths comprising:

5 light emission means for emitting light containing wavelength components to be output;

a reflecting layer placed in proximity to said light emission means;

10 a semi-reflecting layer group placed in opposition with said reflecting layer with said light emission means therebetween, wherein semi-reflecting layers that reflect some light emitted from said light emission means having specific wavelengths and that transmit the remainder thereof are stacked in order in the direction of light advance so as to
15 correspond with light wavelengths to be output; and

two or more light emission regions wherein the wavelength of the output light differs; wherein:

the distance between the reflecting surface for light from the light emission means side of the semi-
20 reflecting layer that partially reflects light output from that light emission region and a point existing in the interval from the end of said light emission means on the semi-reflecting layer group side to said reflecting layer is adjusted so as to have an optical path length such that light
25 of the wavelength output from that light emission region resonates.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Tatsuya SHIMODA, Tomoko KOYAMA, Attn: PCT Branch
Takeo KANEKO,
Jeremy Henley BURROUGHS

Application No. U.S. National Stage of PCT/GB00/02143

Filed: November 29, 2001

Docket No.: 111241

For: MULTIPLE WAVELENGTH LIGHT EMITTING DEVICE, ELECTRONIC
APPARATUS, AND INTERFERENCE MIRROR

**SUBMISSION OF THE ANNEXES TO THE
INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

Director of the U.S. Patent and Trademark Office
Washington, D.C. 20231

Sir:

Attached hereto is are the annexes to the International Preliminary
Examination Report (Form PCT/IPEA/409). The attached material replaces the material in
the claims at page 51, lines 1-26.

Respectfully submitted,



James A. Oliff
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Registration No. 38,565

JAO:EDM/cmm

Date: November 29, 2001

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Claims:

1. A multiple wavelength light emitting device for emitting light of a plurality of differing wavelengths

5 comprising:

light emission means for emitting light containing wavelength components to be output;

a reflecting layer placed in proximity to said light emission means;

10 a semi-reflecting layer group placed in opposition with said reflecting layer with said light emission means therebetween, wherein semi-reflecting layers that reflect some light emitted from said light emission means having specific wavelengths and that transmit the remainder thereof are
15 stacked in order in the direction of light advance so as to correspond with light wavelengths to be output; and

two or more light emission regions wherein wavelength of output light differs; wherein:

20 distance between reflecting surface for light from light emission means side of semi-reflecting layer that partially reflects light output from that light emission region and a point existing in interval from end of said light emission means on semi-reflecting layer group side to said reflecting layer is adjusted so as to have an optical path
25 length such that light of wavelength output from that light emission region resonates.